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Title : Sex differences and individual variation in diets of adult grey seals using stable isotopes of carbon (δC13) and nitrogen (δN15)

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Abstract : Grey seals are size dimorphic with males and females organizing diving and foraging behaviour differently, potentially reflecting differences in diet. Stable isotopes of nitrogen (δN15) and carbon (δC13) provide useful tools for estimating trophic positions of, and carbon flow to, consumers in food webs. Stable isotopes were analyzed for known-aged individual adult grey seals (n=32) from Sable Island between 1996-2001. Samples of skin were taken at deployment of satellite tags (either May/June or September) and recapture (January) at the start of the breeding season. Males and females had significantly different δN15 and δC13 values at deployment and this difference was enhanced over the length of study period (two-way rm Anova: δC13 $F=5.84$; $p=0.02$; δN15 $F=5.95$; $p=0.02$). On average males were more enriched in both δN15 and δC13 (deployment δC13 =-16.15±0.14, δN15 =18.06±0.26; recapture δC13 =-15.97±0.15, δN15 =18.52±0.21) than females (deployment δC13 =-16.63± 0.07, δN15 = 17.48±0.02; recapture δC13 =-16.62±0.14, δN15 =17.39±0.20). An evaluation of potential prey suggests that isotope values of male seals reflect feeding more heavily on benthic prey, whereas females fed more pelagically and bathypelagically and these diet differences became more pronounced over the deployment period. The direction of temporal changes in signatures amongst individuals was consistent in that both δN15 and δC13 were either enriched or depleted concomitantly. These results are consistent with preliminary diet estimates for these same individuals based on fatty acid signature analysis and previously defined differences in foraging behaviour, including temporal shifts in both diet and diving. In addition, key fatty acids characteristic of pelagic/benthic systems were shown to correlate significantly with δC13 signatures, providing additional support for the usefulness of these two approaches as diet indicators.